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HALLIBURTON NUS
Environmental Corporation

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TO: LEON COLLINS

DATE: AUGUST 28, 1991

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SUBJECT: ROCKY FLATS (2K88)
SOLAR POND PROJECT
SIZE REDUCTION/COMPOSITING
TREATABILITY STUDY SAMPLES

The purpose of this memorandum is to summarize proposed methods for size reduction and composite sample preparation of samples for treatability study testing.

Goals of the treatability sample size reduction and compositing:

1. Reduce Pondcrete, Saltcrete, and 207C sludge to a particle size less than 10 mesh screen.

2. To homogenize the individual grab samples of each waste form producing a composite sample which is representative of the entire population sampled.

Expected consistency of waste forms:

Pondcrete: This material is believed to range from wet clay-like soil to dry brittle material. The Pondcrete also may have a sand-like texture.

Saltcrete: Saltcrete is believed to have an abrasive texture with a salt content ranging to 40%, by weight.

207C Sludge: The sludge is a combination of two layers from the pond. The upper layer is crystalline and similar to rock salt, the underlying layer (and material at the berm edge) is finely-divided and silt-like.

The grab samples of each waste form will be collected as described in the respective Standard Operating Procedure (SOP). The total volume of Pond 207C sludge that will require grinding and homogenization is approximately 62 gallons. Seventy-eight gallons each of Pondcrete from metal containers, Pondcrete triwalls, and Saltcrete will be collected. This material will require size reduction to less than 10 mesh screen size and then will require homogenization.

Size Reduction

Due to the quantity of material requiring size reduction four mills will be used in parallel. All waste forms will be screened at 10 mesh prior to being fed to the mill, so that only the material requiring size reduction (i.e., >10 mesh) will be ground. Each mill can grind a charge of 1000 to 2000 grams, depending on the character of the material. The softer the material the faster and easier it will grind, and the greater the quantity of material which can be ground at one time. A specified quantity of material will be fed to each mill and the mill will be placed on the drive roll for a specified time. Then the contents of the mill will be screened at 10 mesh, and the >10 mesh material will be returned to the mill with fresh feed and the mill is returned to the drive roll for the specified time period.

Initially, trial and error procedures are used on each material to determine the optimum feed charge, grinding time, and whether a ball or rod charge will provide the most representative feed.

A typical trial and error procedure would include:

1. Load two of the mills with complete rod charges, and two mills with complete ball mill charges. A complete ball charge for this size of mill will be one-and-one-half of the charges supplied by the vendor.

2. Into one rod mill and one ball mill add 1000 of >10 mesh material. To the other two mills add 1500 grams of >10 mesh material. Use of all four mills makes it possible to perform the trial and error procedure more rapidly.

3. Place all four mills on the drive rolls and grind for 10 minutes.

4. Separately empty out the mills and screen the product at 10 mesh. Weigh the oversize and visually compare the undersize products.

If the ball mill product appears to be overground (lots of fines) a rod mill should be used. However, if the rod mill charges must be ground for an excessive time period (>30 minutes) to achieve a 100% less than 10 mesh product, a ball mill should be used. If the material in all of the mills is overground and all of it is finer than 10 mesh, the grind time should be shortened.

The objective of the trial and error tests is to be able to add a set charge to each mill, and let it roll for a set time period, and when the product is screened, virtually none of the material needs to be returned to the mill with the next charge.

If the material packs onto the sides of the mill it can easily be removed using a flat laboratory blade (1" x 10"). If the caked material is too difficult to remove and screen, then prior to milling all of th material greater than 10 mesh can be spread out on a sheet of plastic and allowed to air dry in the permacon for 1 to 2 days. We must anticipate that the material will cake in the mill, however prescreening at 10 mesh will reduce the handling problems.

Recommended Equipment and Vendor

Sepor, Inc. Contact: Joe Vargas
Sepor, Inc.
P.O. Box 578
Wilmington, California 90748
Phone: (213) 830-6601
FAX: (213) 830-9336

	Price
Sepor Drive Rolls - Batch (1 ph/60 hz) #10E-002 (one required)	$2,675
Ball and Rod Mill #10E-008 (four required)	575/mill
Ball Mill Charge #010E-015 (six required)	25/charge
Rod Mill Charge #010E-016 (four required)	35/charge

Sepor Drive Rolls will handle four Ball or Rod Mills.

Homogenization

Several methods may be used to homogenize the waste forms. These methods are described and equipment models and vendors are recommended.

Method 1: This method is applicable to the 207C Sludge, Ponderote, and Saltcrete. After the sludge is taken from the original 55-gallon drum and ground, the ground material will be placed in 8 to 9 5-gallon buckets. Successive aliquots of each bucket (approximately 1/2 gallon per aliquot) will be taken and placed in a 55-gallon drum.

Method 1a: This method is applicable to Ponderete and Saltcrete. The ground material will be placed on a 10 ft. by 10 ft. piece of canvas. The material will be spread out evenly on the canvas using a stainless steel shovel. Two corners of the canvas will be folded over to match the corners of the opposite side of the canvas. Then, the canvas will be laid flat and two corners perpendicular to the first fold will be folded. Lay the canvas flat after each fold and spread the material flat on the canvas. This procedure will be repeated a minimum of 5 times or until the material appears to be well mixed. It may be necessary to first place a plastic layer down with side berms to prevent any free water loss.

Method 2: This method is applicable to Pond 207C Sludge, Ponderete, and Saltcrete. All of the material will be placed in a ribbon mixer and mixed for a specified time.

Vendor

Sepor, Inc.
P.O. Box 678
Wilmington, California 90748
Phone: (213) 830-6801
FAX: (213) 830-9336

	Price
• Ribbon Blender Model 4 Catalog No. 080E-006	$6,400

Recommendation

The homogenization could be conducted satisfactorily using any of the above methods. We suggest that Method 1 and/or 1a be used because there are no cost outputs for equipment. If the quality of blending obtained in Methods 1 or 1a is not considered sufficient, the two methods can be combined with the blended material from Method 1 being reblended by Method 1a. However, if EG&G has the ribbon blender, then that method should be used. Also, if EG&G could use the ribbon blender for other purposes, then they should purchase the equipment and use that method to homogenize the waste.

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